

CLAIMS

I claim:

1. A method of applying polyacrylamide (PAM) for stabilizing soil particles of a land area from erosive movement about the land area, the method comprising:
establishing a uniform mixture ratio for a mixture of PAM and water to be applied to a land area;
calculating a total application rate for applying the mixture to the land area;
mixing PAM with water according to the uniform mixture ratio to form a mixture for application to the land area;
applying the mixture to a top surface of soil of the land area; and
terminating the application of the mixture when PAM reaches sufficient depth penetration below a top surface of the soil.
2. The method of claim 1 wherein the establishing step includes mixing PAM and water in a ratio of about 1 part PAM to between about 500 and about 5000 parts water by volume.
3. The method of claim 1 wherein the establishing step includes mixing PAM and water in a ratio of 1 part PAM to about 1000 parts water by volume.
4. The method of claim 1 additionally comprising the step of determining a number of times that the mixture of the uniform mixture ratio needs to be applied to the land area to achieve the calculated total application rate of the PAM.

5. The method of claim 1 wherein the applying step comprises making a series of applications of the mixture to the surface for a number of times until the application rate for the soil of the land area is achieved.

6. The method of claim 1 wherein the applying step includes misting a portion of the total application rate of the mixture onto the surface of the land area to produce a tack coat for initially stabilizing topmost soil particles on the top surface of the land area against soil particle movement caused by subsequent mixture applications.

7. The method of claim 1 wherein the applying step includes continuing to apply the mixture to the surface of the soil until the soil of the land area becomes saturated and stopping the application of the mixture top surface becomes saturated.

8. The method of claim 7 additionally comprising detecting saturation of the soil when the mixture appears to be accumulating on the surface rather than being relatively quickly absorbed into the ground and the mixture on the top surface appears to reflect ambient light.

9. The method of claim 8 wherein the applying step includes waiting for a time period after detection of saturation such that the mixture is able to penetrate the ground below the surface, wherein the time period comprises the time required for any puddles of the mixture on the top surface of the soil to be absorbed into the soil below the top surface.

10. The method of claim 9 wherein the waiting step is conducted for a time period that is less than the time required for the top surface of the soil to dry.

11. The method of claim 1 wherein the applying step includes the step of directing a spray of the mixture onto the top surface of the soil of the land area from at least four directions, each of the directions being oriented at about 90 degrees to at least two of the other directions.

12. The method of claim 11 wherein the applying step includes the step of directing a spray of the mixture at a substantially perpendicular angle downward onto the top surface of the soil of the land area, wherein the direction of the substantially perpendicular spray varies less than about 15 degrees measured from an axis perpendicular to the surface of the soil.

13. The method of claim 1 additionally comprising testing the extent of penetration of the PAM below the top surface of the soil of the land area.

Sub 14. ~~The method of claim 1 wherein the testing step includes removing a core sample of the soil from the land area.~~

15. The method of claim 1 additionally comprising the step of comparing the depth penetration of the PAM below the top surface of the soil of the land area to a set of minimum depth penetration values based upon the general slope of the land area to determine the minimum depth penetration needed for the land area being treated before terminating application of the mixture to the land area;

wherein if the general slope of the land area is between substantially level and a general slope of 4 to 1, inclusive, the sufficient depth penetration is a minimum of about 1.3 inches;

wherein if the general slope of the land area is about 3 to 1, the sufficient depth penetration is a minimum of about 1.5 inches;

wherein if the general slope of the land area is about 2 to 1, the sufficient depth penetration is a minimum of about 2 inches;

wherein if the general slope of the land area is about 1.5 to 1, the sufficient depth penetration is a minimum of about 2.5 inches; and

wherein if the general slope of the land area is about 1 to 1 or steeper, the sufficient depth penetration is a minimum of about 3 inches.

16. The method of claim 15 additionally comprising exceeding the total application rate calculated if the sufficient minimum depth penetration is not achieved through application of mixture to the soil at the total application rate.

17. A method of applying polyacrylamide (PAM) for stabilizing soil particles of a land area from erosive movement about the land area, the method comprising:
establishing a uniform mixture ratio for a mixture of PAM and water to be applied to a land area;
calculating a total application rate for applying the mixture to the land area;
mixing PAM with water according to the uniform mixture ratio to form a mixture for application to the land area; and
applying the mixture to a top surface of soil of the land area by misting a top surface of the land area with the mixture for producing a tack coat of the PAM for initially stabilizing

topmost soil particles on the top surface of the land area against soil particle movement caused by any subsequent mixture applications.

20 18. The method of claim 17 additionally comprising the step of determining a number of times that the mixture of the uniform mixture ratio needs to be applied to the land area to achieve the calculated total application rate of the PAM.

45 19. The method of claim 18 wherein the applying step comprises making a series of applications of the mixture to the soil according to the number of times determined to achieving the total application rate for the soil of the land area using the is achieved.

20 20. The method of claim 19 wherein the applying step includes continuing to apply the mixture to the surface of the soil until the soil of the land area becomes saturated and stopping the application of the mixture top surface becomes saturated.

21 21. The method of claim 20 additionally comprising detecting saturation of the soil when the mixture appears to be accumulating on the surface rather than being relatively quickly absorbed into the ground and the mixture on the top surface appears to reflect ambient light.

22 22. The method of claim 21 wherein the applying step includes waiting for a time period after detection of saturation such that the mixture is able to penetrate the ground below the surface, wherein the time period comprises the time required for any puddles of the mixture on the top surface of the soil to be absorbed into the soil below the top surface.

25. The method of claim 23 wherein the waiting step is conducted for a time period that is less than the time required for the top surface of the soil to dry.

26. The method of claim 17 wherein the applying step includes the step of directing a spray of the mixture onto the top surface of the soil of the land area from at least four directions, each of the directions being oriented at about 90 degrees to at least two of the other directions.

27. The method of claim 17 wherein the applying step includes the step of directing a spray of the mixture at a substantially perpendicular angle downward onto the top surface of the soil of the land area, wherein the direction of the substantially perpendicular spray varies less than about 15 degrees measured from an axis perpendicular to the surface of the soil.

28. The method of claim 17 additionally comprising testing the extent of penetration of the PAM below the top surface of the soil of the land area.

Sub
A2 27. The method of claim 17 wherein the testing step includes removing a core sample of the soil from the land area.

28. The method of claim 17 additionally comprising the step of terminating the application of the mixture when PAM reaches sufficient depth penetration below a top surface of the soil.

29. The method of claim 28 additionally comprising comparing the depth penetration of the PAM below the top surface of the soil of the land area to a set of minimum depth penetration values based upon the general slope of the land area to determine

the minimum depth penetration needed for the land area being treated before terminating application of the mixture to the land area;

wherein if the general slope of the land area is between substantially level and a general slope of 4 to 1, inclusive, the sufficient depth penetration is a minimum of about 1.3 inches;

wherein if the general slope of the land area is about 3 to 1, the sufficient depth penetration is a minimum of about 1.5 inches;

wherein if the general slope of the land area is about 2 to 1, the sufficient depth penetration is a minimum of about 2 inches;

wherein if the general slope of the land area is about 1.5 to 1, the sufficient depth penetration is a minimum of about 2.5 inches; and

wherein if the general slope of the land area is about 1 to 1 or steeper, the sufficient depth penetration is a minimum of about 3 inches.

32. The method of claim 17 wherein the establishing step includes mixing PAM and water in a ratio of about 1 part PAM to between about 500 and about 5000 parts water by volume.

33. The method of claim 17 additionally comprising the step of considering the relative compaction of the soil of the land area, and increasing a number of times of applications of the mixture if the top surface of the soil of the land area has a compacted crust for loosening the compaction of the soil to enhance the penetration of subsequent applications of the mixture into the soil.

32. A method of applying polyacrylamide (PAM) for stabilizing soil particles of a land area from erosive movement about the land area, the method comprising:

determining the degree of stability of the soil of the land area to be treated including testing the vulnerability to erosion of the soil of the land area to be treated; and calculating a total application rate for applying the mixture to the land area.

33. The method of claim 32 wherein the determining step includes providing at least a first tray, removing a sample of the soil from the land area to be treated, placing at least a portion of the soil sample in the first tray, tilting the first tray to produce a slope in an upper surface of the sample in the first tray.

34. The method of claim 33 wherein tilting the first tray includes creating a slope of the upper surface of the sample of about 3 to 1.

35. The method of claim 33 additionally comprising pouring a first liquid on the soil sample in the first tray near an uppermost end of the first tray.

36. The method of claim 35 additionally comprising collecting in a first container the portion of the first liquid that drains from a lowermost end of the first tray and any soil particles carried by the portion of the first liquid, and categorizing the appearance of the first liquid and soil particles in the first container based upon a predetermined chart rating the erodability of the soil,

wherein when the contents of the first container is clear, the soil is categorized as not erodable,

wherein when the contents of the first container is nearly clear, the soil is categorized as slightly erodable,

wherein when the contents of the first container is cloudy, the soil is categorized as moderately erodable,

wherein when contents of the first container is very silty, the soil is categorized as easily erodable,

wherein when contents of the first container is muddy in appearance, the soil is categorized as very erodable, and

wherein when contents of the first container is nearly a slurry, the soil is categorized as difficult to control.

36. The method of claim 33 wherein the determining step includes measuring the general slope of the top surface of the soil of the land area to be treated.

37. The method of claim 36 including establishing a tentative application rate for the land area by categorizing the general slope of the top surface of the land area;

wherein if the general slope of the top surface of the soil is

substantially level, assigning a first category tentative application rate of about 1 gallon of PAM per acre;

wherein if the general slope of the top surface of the soil is about

10 to 1, assigning a second category tentative application rate of about 1.5 gallons of PAM per acre;

wherein if the general slope of the top surface of the soil is about 6

to 1, assigning a third category tentative application rate of about 2 gallons of PAM per acre;

wherein if the general slope of the top surface of the soil is about 4

to 1, assigning a fourth category tentative application rate of about 3 gallons of PAM per acre;

wherein if the general slope of the top surface of the soil is about 3

to 1, assigning a fifth category tentative application rate of about 4 gallons of PAM per acre;

wherein if the general slope of the top surface of the soil is about 2 to 1, assigning a sixth category tentative application rate of about 6 gallons of PAM per acre;

wherein if the general slope of the top surface of the soil is about 1.5 to 1, assigning a seventh category tentative application rate of about 8 gallons of PAM per acre; and

wherein if the general slope of the top surface of the soil is about 1 to 1 or steeper, assigning an eighth category tentative application rate of about 8 gallons of PAM per acre.

38. The method of claim 37 wherein the determining step includes:

pouring a first liquid onto a sample of the soil of the land area, collecting the portion of the first liquid that drains from the sample and any soil particles carried by the portion of the first liquid;

categorizing the erodability of the soil as not erodable, slightly erodable, moderately erodable, easily erodable, very erodable, or difficult to control; and

adjusting the tentative application rate based upon the erodability of the soil sample to determine a total application rate, increasing the tentative application rate if the soil sample showed a relatively higher vulnerability to erosion;

wherein if the soil sample was moderately erodable, increasing the application rate by one slope category;

wherein if the soil sample was easily erodable, increasing the application rate by two slope categories;

wherein if the soil sample was very erodable, increasing the application rate by three slope categories; and

wherein if the soil sample was not controllable, increasing the application rate by four slope categories.

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Variable	Mean	SD	Min	Max
Age	38.5	12.5	25	65
Gender	0.5	0.5	0	1
Marital status	0.7	0.5	0	1
Education	12.5	2.5	9	16
Income	3500	1500	1000	8000
Health status	0.8	0.4	0	1
Stress level	4.5	1.5	1	7
Life satisfaction	5.5	1.5	1	9
Work satisfaction	6.5	1.5	1	9
Family satisfaction	7.5	1.5	1	9
Community satisfaction	8.5	1.5	1	9
Overall satisfaction	7.5	1.5	1	9